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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/030,111	06/03/2002	Tomasz Andrzej Nasilowski	NAS13001/JEK	6784

23364 7590 03/29/2004

BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314

EXAMINER

BARBER, THERESE

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/030,111

Applicant(s)

NASILOWSKI ET AL.

Examiner

Therese Barber

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the dichroic elements and the elements comprising the fused optical waveguide technology of the combining must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 45 is objected to because of the following informalities:

Regarding claim 45, line 2, the term “radio” should be changed to the term “ratio”.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 27-31, 33-35 and 46 are rejected under 35 U.S.C. 112, first paragraph, as failing to

comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

With respect to claims 27-31 and 33-35, the specification on page 12, lines 6-13 and page 13, lines 25-34, does not show how the combining unit is made to combine light from the optical waveguides into one light beam. In figure 4, the combining unit is shown as a box. Also, the specification does not show how fused optical wavelength technology and the dichroic elements are being utilized in the combining unit. Absence further guidance one of ordinary skill could not make the invention having the claimed combining unit.

With respect to claim 35, the invention of this claim requires “fused optical wavelength technology”. However, the specification fails to describe/explain what constitutes “fused optical wavelength technology”. Consequently, one of ordinary skill in the art would be unable to make the invention of this claim.

With respect to claim 46, the invention of this claim requires “waveguide technology”. However, the specification fails to describe/explain what constitutes “waveguide technology”. Consequently, one of ordinary skill in the art would be unable to make the invention of this claim.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 27, 32, 38-44, 46, and 47 are rejected under 35 U.S.C. 112, second paragraph, as

being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 27, the claim is confusing because it lacks any relationship to the waveguide system and the rotating polygon of claim 26.

With further respect to claim 27, the limitation of “said light beam including at least one waveguide composed of the light generated from the at least two light sources” is indefinite because a waveguide guides light and a waveguide does not compose light

With respect to claims 32 and 46, both claims are indefinite because each depends from a cancelled claim. For examination purposes, these claims have been treated as depending from claim 26.

Further with respect to claims 35 and 46, the limiting meaning of the phrase “waveguide technology” is unclear because it fails to point out what structure is or is not required in the claimed language.

With respect to claims 38-44, the positioning arrangement of the extremities of the bundle of optical waveguides is unclear. For example, how can the extremities be arranged in the image plane of a lens system when the bundle must guide light to the rotating polygon and the inspection unit receives transmitted light? Also, in line 4, “or” is indefinite because it equates non-equivalent elements.

With respect to claim 47, the multiple recitations of “and/or” causes the claim to be ambiguous, as it is unclear what is or is not claimed.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 26, 32 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krieg et al. (USPN 6,509,537 B1) and Davis et al. (USPN 6,078,018).

9. Regarding claims 26 and 32, Krieg discloses an optical sorting device (fig.1) comprised of an inspection unit (2) arranged to inspect products on their acceptability (3; col. 2, lines 34-35 and 48-54), the inspection unit including one light source for providing light (1) to waveguide system to scan the products as they are transported past the inspection device (col. 2, lines 36-43); a rotating polygon (35) arranged and positioned to align and reflect light from the light source onto the products as the products are transported past the inspection device (col. 3, lines 23-25); a transport system (6) configured to transport the products in the product stream towards the inspection unit (col. 2, lines 37-38); and a rejection unit arranged to remove unacceptable products from the product stream (col. 2, lines 50-54).

Krieg fails to disclose wherein the inspection unit includes at least two light sources for provide light to the waveguide system and wherein the light source radiate light of a different wavelength.

Davis discloses a sorting device that utilizes light sources that employs one or more light sources (24, 34, and 36) that radiate light in different wavelength ranges (col. 3, lines 62-63 and col. 4, lines 7-21). Davis also discloses that scanning (inspection) system of the sorting device

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analyzes all of the light reflected from the material in the product stream (col. 2, lines 28-31). It is well known in the art that a laser produces a coherent beam of light and that laser modules having wavelength ranges from UV, violet, blue-green-red to infrared are readily available and routinely selected depending on the specifications needed for the desired use.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the sorting device as disclosed by Krieg by replacing its light source with the light system as disclosed by Davis, thereby, improving the performance and accuracy of the sorting device by providing light sources that are capable of radiating light in different wavelengths, allowing more than one parameter to be measure.

Regarding claim 46, Krieg discloses a sorting device wherein the inspection unit at a sending side is provided with waveguide technology (figs. 2-4).

10. Claims 27, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krieg and Davis as applied to claim 26 above, and further in view of Kumar (USPN 6,545,240 B2).

Krieg and Davis disclose the limitations of the sorting device as rejected above. In addition, Davis discloses a sorting device that employs a dichroic mirror (38).

Krieg and Davis fail to discloses a sorting device having a plurality of coupling-in optical elements to focus the light generated from the at least two light sources; a combining unit for combining light from the optical waveguides into light beam; focusing optics arranged to focus the light beam onto the products in the product stream; and fused optical wavelength technology.

Kumar discloses a sorting device that utilizes a plurality of coupling-in optical elements (82, 84) to focus the light generated from the light source (col. 9, lines 4-8); a combining unit (50) to combine the light from the optical waveguides into one light beam (col. 7, lines 19-21); fused optical wavelength technology (50; col. 7, lines 19-21); and focusing optics (86) arranged to focus the light beam onto the products in the product stream (col. 9, lines 53-58), in order, to provide uniform laser power density along a plane, resulting in greater sorting accuracy (col. 9, line 66 to col. 10, lines 4). As best understood by the examiner, fused optical wavelength technology involves combining two or more optical wavelengths into a single optical wavelength. Therefore, the polarizing beam splitter (50, col. 7, lines 19-21) can be viewed as utilizing fused optical wavelength technology.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the sorting device with its laser system as disclosed by Krieg and Davis to include the different optical elements as disclosed by Kumar, thereby, improving the scanning capabilities of the sorting device by providing optical elements which can provide uniform laser power density along the plane of the transport system, resulting in greater sorting accuracy for the device.

11. Claims 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krieg, Davis and Kumar as applied to claim 27 above, and further in view of Shimizu (USPN 5,960,142).

Krieg, Davis and Kumar disclose the limitations of the sorting device as rejected above.

Krieg, Davis and Kumar fail to disclose that the semiconductor lasers that are cooled by a Peltier element.

Shimizu discloses a semiconductor laser module using a Peltier cooler (fig. 1) in order, to obtain a modulated optical signal (col. 1, lines 10-14). Shimizu discloses that the semiconductor laser module utilizes a Peltier cooler to control the temperature of the semiconductor laser, thereby, ensuring stable operation of the semiconductor laser (col. 1, lines 14-21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the light sources as disclosed by Krieg, Davis and Kumar to incorporate the Peltier cooler as disclosed by Shimizu, in order, to produce stable operation of the laser sources.

12. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krieg, Davis and Kumar as applied to claim 27 above.

Krieg, Davis and Kumar disclose the limitations of the sorting device as rejected above.

Krieg, Davis and Kumar fail to disclose that the coupling-in optical elements are provided with connectors.

It is well known in the art that connectors are devices that are mounted on the end of optical elements in order to join the ends of the optical elements with optical fibers, light source(s), detector(s), or other optical devices. Connectors are utilized to transfer light efficiently.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to attach connectors to the coupling-in optical elements in the sorting device

as disclosed by Krieg, Davis and Kumar, thereby, efficiently transferring light between optical devices while minimizing the loss of the any light during this transfer.

13. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krieg and Kumar.

Regarding claim 36, Krieg discloses an optical sorting device (fig.1) comprised of an inspection unit (2) arranged to inspect products on their acceptability (3; col. 2, lines 34-54), based on electromagnetic radiation (1); the waveguide system including a rotating polygon (35) arranged and positioned to align and reflect light from the electromagnetic radiation onto the products as the products are transported past the inspection device (col. 3, lines 23-25); a transport system (6) configured to transport the products in the product stream towards the inspection unit (col. 2, lines 37-38); and a rejection unit arranged to remove unacceptable products from the product stream (col. 2, lines 50-54).

Krieg fails to disclose wherein the inspection unit includes a waveguide system disposed at the detection side and wherein the waveguide system comprises a bundle of optical waveguides.

Kumar discloses a sorting device that utilizes a plurality of optical waveguides (88) as light collectors wherein the light distribution and spectral analyzer unit (28) take measurements of the light collected from the optical fibers (col. 5, lines 63-67 and col. 10, lines 41-53). Also, Kumar discloses a detector system (98-104) that is connected to the optical fibers (fig. 8; col. 10, lines 53 to col. 11, line 33) wherein the detector system provides information that assists in the identification of the products (col. 14, lines 3-14 and col. 15, lines 30-39).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the sorting device as disclosed by Krieg to include the detection system with the optical waveguides as disclosed by Kumar, thereby, improving the performance and accuracy of the sorting device by utilizing the detection system in order to obtain information including but not limited to spectral analysis for identification of the products.

14. Claims 38, 39, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krieg and Kumar as applied to claim 37 above and further in view of Reid et al. (USPN 3,786,266).

Krieg and Kumar disclose the limitations of the sorting device as rejected above.

Krieg and Kumar fail to disclose a sorting device wherein the bundles of the optical waveguides are in an image plane of a lens system; wherein the bundles of waveguides are divided into separate parts corresponding to well-defined portions of the formed image; and wherein the bundles forming the separate parts are led separately to detectors.

Reid discloses an arrangement of optical fibers (figures 4 and 5) wherein the optical fiber bundle form two light paths and has transmitting and receiving surfaces for forming images (col. 4, line 53 to col. 5, line 14). Reid discloses that the illuminated surface of the optical fiber bundle images light onto a surface via a lens and the reflected light from the surface will pass through a lens in order to be detected by a detector (col. 4, line 63 to col. 5, line 1). Reid discloses that the light determining means can be connected to control means for separating the different surfaces (col. 3, lines 6-8).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the optical fibers of the sorting device as disclosed by Krieg and Kumar to incorporate the arrangement of the optical fibers and lens for imaging as disclosed by Reid, in order, to improve the performance and accuracy of the image forming/processing capabilities of the sorting device by utilizing the information obtained from the light emitted from the products for identification purposes.

15. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krieg, Kumar and Reid as applied to claim 39 above and further in view of Jung et al. (USPN 5,962,262).

Krieg, Kumar and Reid disclose the limitations of the sorting device that utilizes bundles of optical waveguides and lens system to form an imaging system as rejected above.

Krieg, Kumar and Reid fail to disclose a sorting device that utilizes bundles of optical waveguides and lens system to form an imaging system wherein the bundle of optical waveguides are divided into concentric bundles.

Jung discloses an optical device comprised of optical fibers wherein the source and receiver optical fibers are concentric bundles that have different core diameters (col. 29, lines 56-67; fig. 20A) and are utilized to take measurements at a desired or at a predetermined height and angle, thereby, minimizing any height and angular dependency problems during imaging (col. 3, lines 47-60).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the optical fibers of the sorting device and its imaging system as disclosed by Krieg, Kumar and Reid to incorporate the concentric arrangement of the optical

fibers as disclosed by Jung, in order, to improve performance and accuracy of the image forming/processing capabilities of the sorting device by taking images of the products at different height and angular positions.

16. Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krieg, Kumar, and Reid as applied to claim 39 above and further in view of in Buechler et al. (USPN 3,788,741).

Krieg, Kumar, and Reid disclose the limitations of the sorting device that utilizes bundles of optical waveguides and lens system to form an imaging system as rejected above.

Krieg, Kumar, and Reid fail to disclose wherein the image is divided into two or more images by the optical splitting elements and wherein the optical splitting elements have outgoing waveguides.

Buechler discloses an optical device comprised of bundles of optical fibers, wherein the bundles have optical waveguides that are utilized as light receivers or light transmitters (col. 3, lines 32-36). Buechler employs a beam splitting optical element (30) in conjunction with the optical waveguides that causes an image to be defined in two axially spaced plane in order to obtain surface reflectivity (col. 5, lines 3-19; fig. 9).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the optical fibers of the sorting device with its imaging system as disclosed by Krieg, Kumar, and Reid to incorporate the splitting optical elements and waveguide arrangement as disclosed by Buechler, in order, to improve the performance and accuracy of the

image forming/processing capabilities of the sorting device by taking images of the surface reflectivity of the products.

17. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krieg and Kumar as applied to claim 36 above and further in view of Jung.

Krieg and Kumar discloses the limitations of the sorting device as rejected above.

Krieg and Kumar fail to disclose that the optical waveguides are optical fibers that have large cores diameter/mantle diameter ratio and/or high numerical aperture in the sorting device.

Jung discloses an optical device comprised of optical fibers, wherein the source and receiver optical fibers are bundles that have different core diameters and numerical aperture (col. 29, lines 59-67; fig. 20A) and are utilized to take measurements at a desired or at a predetermined height and angle, thereby, minimizing the height and angular dependency problems (col. 3, lines 47-60).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the optical fibers of the sorting device as disclosed by Krieg and Kumar to incorporate the arrangement of the optical fibers with the different core diameters and numerical apertures as disclosed by Jung, in order, to improve the performance and accuracy of the image forming/processing capabilities of the sorting device by being able to take images of the products which have different height and angular positions as the products stream by via the transport system.

18. Claims 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krieg

and Kumar.

Regarding claim 47, Krieg discloses an optical sorting device (fig. 1) comprised of an inspection unit (2) arranged to inspect products on their acceptability (3; col. 2, lines 34-54), wherein the inspection unit includes a rotating polygon (35) arranged and positioned to align and reflect light from the electromagnetic radiation onto the products as the products are transported past the inspection device (col. 3, lines 23-25); a transport system (6) configured to transport the products in the product stream towards the inspection unit (col. 2, lines 37-38); and a rejection unit arranged to remove unacceptable products from the product stream (col. 2, lines 50-54).

Krieg fails to disclose wherein the inspection unit includes a bundle of optical waveguides wherein the bundle for the sending and detection parts are common.

Kumar discloses a sorting device that utilizes a plurality of optical waveguides (optical fibers (88)) as light collectors wherein the light distribution and spectral analyzer unit (28) take measurements of the light collected from the optical fibers (col. 5, lines 63-67 and col. 10, lines 41-53). In addition, Kumar discloses a detector system (98-104) that is connected to the optical fibers (fig. 8; col. 10, lines 53-67).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the sorting device as disclosed by Krieg to include the detection system with the optical waveguides as disclosed by Kumar, thereby, improving the performance and accuracy of the scanning capabilities of the sorting device by utilizing the detection system with its optical waveguides in order to obtaining information including but not limited to spectral analysis.

19. Regarding claim 48, Kumar discloses a lens system (86) arranged to focus emitted light

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onto the products and to focus the light received thereby onto the waveguides (88; fig. 6).

20. Regarding claim 49, Kumar discloses wherein at least two additional waveguide systems (26) are provided on the sending side and/or the detection side of the inspection unit (col. 5, lines 63-67; fig 2).

Response to Amendment

21. It is noted that the applicants have cancelled claims 1-25 and added claims 26-49 to this patent application. Applicant's arguments with respect to claims 26-49 have been considered but are moot in view of the new ground(s) of rejection.


Conclusion

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Therese Barber whose telephone number is (571) 272-2486. The examiner can normally be reached on Monday to Friday from 8:30 a.m. to 6:30 p.m., with alternative Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

tb
22 March 2004


EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER